

City University of New York (CUNY)

CUNY Academic Works

Publications and Research

CUNY Graduate School of Public Health &
Health Policy

2015

Patchy Progress On Obesity Prevention: Emerging Exemplars, Entrenched Barriers, and New Thinking

Christina A. Roberto
Harvard University

Boyd Swinburn
University of Auckland

Corinna Hawkes
World Cancer Research Fund International

Terry T-K Huang
CUNY School of Public Health

Sergio Costa
CUNY School of Public Health

See next page for additional authors

[How does access to this work benefit you? Let us know!](#)

More information about this work at: https://academicworks.cuny.edu/sph_pubs/9

Discover additional works at: <https://academicworks.cuny.edu>

This work is made publicly available by the City University of New York (CUNY).
Contact: AcademicWorks@cuny.edu

Authors

Christina A. Roberto, Boyd Swinburn, Corinna Hawkes, Terry T-K Huang, Sergio Costa, Marice Ashe, Lindsey Zwicker, John H. Cawley, and Kelly D. Brownell

**Patchy Progress On Obesity Prevention:
Emerging Exemplars, Entrenched Barriers, and New Thinking**

Christina A. Roberto,¹ Boyd Swinburn,² Corinna Hawkes,³ Terry T-K Huang,⁴ Sergio A Costa,⁴ Marice Ashe⁵ Lindsey Zwicker,⁵ John H Cawley,⁶ Kelly D. Brownell⁷

¹Department of Social and Behavioral Sciences, Department of Nutrition, Harvard School of Public Health, Boston, MA, USA (Robert Wood Johnson Foundation Health & Society Scholar)

²School of Population Health, University of Auckland, Auckland, New Zealand

²WHO Collaborating Centre for Obesity Prevention, Deakin University, Victoria, Australia

³Head of Policy and Public Affairs, World Cancer Research Fund International, London, UK

⁴College of Public Health, University of Nebraska Medical Center, Omaha, NE, USA

⁵ChangeLab Solutions, Oakland, CA, USA

⁶Department of Policy and Management and Department of Economics, Cornell University, Ithaca, NY, USA

⁷Sanford School of Public Policy, Duke University, Durham, NC, USA

Corresponding author:

Christina A. Roberto, PhD

677 Huntington Avenue

Boston, MA 02115

croberto@hsph.harvard.edu

617.432.7454

Running head: patchy progress on obesity prevention

Keywords: obesity; policy; prevention; framing

Submission to *The Lancet*; Commissioned series

Text Word Count: 4,701 (without key messages)

Summary

Although there have been positive pockets of change, no country has yet turned around its obesity epidemic. Preventing an increase in obesity prevalence will require urgent actions from government as well as a broader spectrum of stakeholders than previously emphasized. In this paper, we review a number of regulatory and non-regulatory actions taken around the world to address obesity and discuss some of the reasons for the patchy progress. In addition, we preview the papers in this *Lancet* series, which each identify priority actions on key obesity issues and challenge some of the entrenched dichotomies that present obesity and its solutions in “either/or” terms. Although obesity is acknowledged as a complex issue, many debates about its causes and solutions are centered around overly simple dichotomies that present seemingly competing perspectives. Examples of such dichotomies explored in this series include: individual versus environmental causes of obesity, personal versus collective responsibilities for actions, supply versus demand explanations for consumption of unhealthy food, government regulation versus industry self-regulation, top down versus bottom up drivers for change, treatment versus prevention priorities, and under versus over nutrition focus. In the current paper, we explore the dichotomy of individual versus environmental drivers of obesity, which lay out two truths: people bear some personal responsibility for their health and environmental factors can readily support or undermine the ability of people to act in their self-interest. We propose a re-framing of obesity that emphasizes the reciprocal nature of the interaction between the environment and individual. Current food environments exploit people’s biological, psychological, social, and economic vulnerabilities, making it easier for them to eat unhealthful foods. This leads to preferences and demands for foods of poor nutritional quality, thus sustaining the unhealthful food environments. Breaking these vicious cycles will need regulatory actions from governments and greater efforts from industry and civil society.

Box 1 Key Messages

1. In 2013, the Member States of the World Health Organization adopted the Global Action Plan for the Prevention and Control of Non-communicable diseases, 2013-2020, which outlines a target of no increase in obesity prevalence.
2. Apart from economic crisis, no country has yet turned around its obesity epidemic. Although there have been positive pockets of change, these mainly reflect a flattening of childhood obesity in some cities and countries with already high rates. Barriers to action have included industry pressures, limited ability or unwillingness of governments to implement policies, and lack of pressure from civil society for policy action.
3. There is emerging consensus on core policy actions that should be taken to promote healthy diets. We use the NOURISHING framework created by the World Cancer Research Fund International to categorize and describe these actions. The framework identifies possible policy actions across three broad domains: the food environment, the food system, and behavior change communication.
4. Global actions to address obesity span limiting marketing to children, regulating food nutritional quality and availability in schools, front-of-package nutrition labeling, taxes on sugar-sweetened beverages, public service campaigns, financial incentives to improve food retail environments, private-public partnerships to encourage food industry reformulation, and health in all policies approaches by governments, among others.
5. Divergent beliefs about what drives and sustains obesity exist. The way the problem is framed underlies all of the existing barriers. In this paper, we examine the false dichotomy that obesity is driven by *either* individual choice *or* environmental influence and suggest these two competing perspectives be merged to reflect the reciprocal relationship between the individual and the environment.
6. The problem of obesity must be re-framed to reflect the interaction between two truths: individuals bear some personal responsibility for their health and environmental factors exploit biological, psychological, social, and economic vulnerabilities that promote overconsumption of unhealthy foods. A vicious cycle is then created. Preferences and demand for unhealthy products are not only shaped by the environment, but they then in turn sustain existing environments that encourage consumption of unhealthy foods. This cycle makes it difficult for people to act in their self-interest, but can be broken with regulatory actions from governments and efforts from industry and civil society.

Introduction

Overweight and obesity continue to rise in every corner of the world, affecting all social, cultural, and economic groups.¹ In 2010, elevated body mass index (BMI) accounted for about 2.8 million annual deaths.² In the first *Lancet* Series on Obesity in 2011, the globalization of food systems that promote ‘passive overconsumption’ of energy-dense, nutrient-poor foods and beverages was identified as the major driver of the obesity pandemic.³ At that time, projections of increasing burdens of obesity and its related diseases,⁴ as well as predictions of high associated economic costs, highlighted the need for urgent and substantial action. Policy and regulatory actions were identified as the most effective and cost-effective means of tackling the problem.⁵ What progress has been made since then?

The most important global step has been the adoption in 2013 by the Member States of the World Health Organization (WHO) of the Global Action Plan for the Prevention and Control of Non-communicable diseases, 2013–2020⁶ with its accompanying Global Monitoring Framework.⁷ This framework includes obesity targets for adults and adolescents, and recommended indicators to track progress. The obesity target in the Monitoring Framework appears modest: no increase in prevalence from 2010 to 2025. The WHO’s plan to address maternal, infant and young child feeding likewise calls for a zero increase in prevalence in children.⁸ Yet, achieving even this seemingly low bar is one of the largest challenges of all the global non-communicable disease targets and will require urgent actions from governments as well as a broader spectrum of stakeholders than previously emphasized.

Apart from economic crisis,⁹ no country has yet turned around its obesity epidemic. Although there are some positive pockets of change, these mainly reflect a flattening of childhood obesity in some cities and countries where rates were already high.¹⁰ Even where there has

been progress, there is widening inequality in obesity prevalence.¹¹ The papers in this second *Lancet* series on obesity collectively ask what else is needed to meet the global targets of no increase in obesity and diabetes. The first *Lancet* series on obesity explained the reasons for the rise in obesity, the projections for the future, and the specific actions needed to reverse these trends. The current series identifies the pockets of progress around the world but then takes a deeper, systemic analysis of several key aspects of obesity to identify underlying barriers to progress and propose different ways of thinking and new ways to accelerate progress. In addition, the papers challenge some of the entrenched competing perspectives that present obesity and its solutions in “either/or” terms. Although obesity is acknowledged as a complex issue, many debates about its causes and solutions center around overly simplistic dichotomies that present seemingly competing perspectives. Examples of such dichotomies include individual versus environmental causes, personal versus collective responsibilities for actions, supply versus demand explanations for consumption of unhealthy food, government regulation versus industry self-regulation, top-down versus bottom up drivers for change, treatment versus prevention priorities, under nutrition versus over nutrition focus, and so on. Examining the junctures where these competing analyses intersect has led to the emergence of important new insights discussed in this series.

Throughout the series, multiple examples of progress are described and these exemplars provide important evidence that the actions recommended by WHO’s Global Non-communicable Disease Action Plan are indeed feasible. However, global progress remains very limited. In the present paper, we first review a number of regulatory and non-regulatory actions taken around the world to address obesity and discuss some of the reasons for the patchy progress. We then examine one dichotomy that has shaped the framing of obesity: obesity is driven by *either* individual choice *or* environmental influence. We suggest these

two competing perspectives be merged to reflect the interaction occurring between the individual and the environment. Finally, we preview the remaining papers in this series, most of which have a focus on food and diets, rather than physical activity, which was discussed in another recent Lancet Series.¹²

Recent Global Actions to Address Obesity

There is reason to feel optimistic about the future of obesity prevention, as many countries have been stepping up their actions to address unhealthy diets. To start, 89% of governments report having units dedicated to non-communicable diseases (including obesity).¹³ There has also been an emerging consensus, based both on research and practice, of the core policy actions that can be taken to promote healthy diets.^{6,14–16} These policy areas have been brought together in the NOURISHING framework, created by the World Cancer Research Fund International.^{17,18} The framework identifies 10 areas where policy actions can be taken within three broad domains: the food environment (e.g., nutrition labeling, economic tools, restricting food advertising, incentivizing healthy retail environments), the food system (e.g., encouraging healthy behaviors through health-related and non-health related policies (‘health in all policies’)), and behaviour change communication (e.g., healthcare visits and nutrition counselling interventions, public awareness campaigns). The ten areas are globally applicable, while recognizing that they would need to be adapted to the different country contexts and populations.

[Insert Figure 1 About Here]

NOURISHING also provides a structure to categorize and monitor global policy actions. The good news is that international policy actions have been taken across the NOURISHING framework. The majority of countries now have some form of strategy or action plan on obesity and/or healthy eating. For example, Chile has just passed a “General law” for obesity

prevention, which includes limiting marketing to children, regulating food availability in schools, and front-of-package food labeling.¹⁹ Peru is in the process of discussing a similar law in congress.¹⁹ There have been several regional political declarations of commitments to action but it is uncertain how many policies and actions stem from broad declarations. Examples include the 2007 Declaration of the Port of Spain by the heads of government of the Caribbean Community,²⁰ the 2011 Pan American Conference on obesity in Aruba,²¹ the 2006 European Health Ministers' meeting on Childhood Obesity in Istanbul,²² and the 2013 Pacific Health Ministers' meeting in Apia.²³ However, a number of countries have taken concrete steps to address obesity. We now describe a series of policy actions that have been taken across the three key domains of the NOURISHING framework: food environment, food system, and behaviour change communication actions.

Food Environment Actions

At least fifty countries now require nutrition information labeling on most pre-packaged foods, and several countries have developed interpretative front-of-package nutrition labeling schemes.²⁴ For example, in 2013, Ecuador announced the eventual adoption of a front-of-package traffic light nutrition labeling system for packaged foods.²⁴ Australia has developed a Health Star Rating system for foods and beverages, which will initially be voluntary, moving to mandatory if there is insufficient uptake by industry.²⁴ Mexico implemented a tax on sugar-sweetened beverages and other 'junk foods' and many countries already have or are actively pursuing taxes on sugar-sweetened beverages to combat both obesity and dental disease.^{25,26} South Korea²⁷ and the UK²⁸ have imposed restrictions on TV advertising of energy-dense and nutrient-poor foods for children. In the United States, New York City has been a leader in obesity prevention by using a wide range of policy tools to improve the food and physical activity environments, promote healthy behaviours, and improve preventive

health services.²⁹ Swinburn et al., describe the New York City efforts in the current *Lancet Series*.¹¹

There have also been a number of school-focused policies. Since 2011, the Dubai government has been enforcing new guidelines that ban junk food and soft drinks in all public and private schools.³⁰ The Mexican government also implemented food regulations aimed at improving the availability and accessibility of healthy foods and beverages in schools.³¹ These regulations include well-defined nutritional criteria and specific recommendations for a healthy midday snack. Hawkes et al in this current *Lancet series* discusses the evidence of the effectiveness of some of these policies.³²

There have also been instances of quasi-regulatory actions that provide financial incentives to businesses to advance public health while encouraging and rewarding private sector innovation.³³ For example, private philanthropies have partnered with government agencies to incentivize improvements to the food retail environment by funding healthy food financing initiatives in US cities and states such as Philadelphia, Louisiana, and California.^{33–36}

Food System Actions

Governments are taking a number of steps to harness action across sectors. South Australia has implemented a health-in-all-policies approach which emphasises that government objectives for a healthy population are best achieved when all sectors include health and wellbeing as a key component of policy development.³⁷ In Australia, a national policy to improve the health of workers, children, and communities has been backed by over \$AUD 100m per year for 9 years.³⁸ The State of Victoria has opted to use its funding to establish a systems-based prevention approach through local governments in high need areas.³⁹ Within

the Healthy Together Victoria initiative, the local health promotion professionals do not deliver programs or projects but they support local settings and community leaders to map their systems (such as food provided in schools or fruit and vegetable supply in a town) and identify and activate the levers within the system to promote healthy food and physical activity environments and behaviours.

Local governments traditionally have regulated the use of land through comprehensive land use planning processes, zoning controls, transportation planning, and the like. Increasingly, these planning processes are being integrated with public health goals to address issues such as obesity and other chronic conditions.⁴⁰⁻⁴² Governments are using these tools to require that new housing and commercial developments adhere to active or transit-oriented design guidelines,⁴³⁻⁴⁸ to increase access to healthy foods such as farmers markets⁴⁹ or limiting fast-food outlets and mobile vendors of healthy food carts,^{50,51} and to increase physical activity access through bike lanes,⁴² green space,⁴² complete streets,^{52,53} and safe routes to school or slow speed zones.⁵⁴ South Africa recently adopted a Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-2017 that includes a health in all policies framework.⁵⁵

Countries have also taken action further upstream in the food system to promote healthier eating. For example, Samoa, which has one of the world's highest prevalence of overweight and obesity at 85%,⁵⁶ instituted a ban on the importation of fatty turkey tails.⁵⁷ The World Trade Organisation forced the withdrawal of the ban and now Samoa is developing less trade restrictive policies to achieve a similar outcome. In addition, governments have developed procurement policies with model nutrition standards for government workplace cafeterias and snack shops, schools, park and recreation departments, hospitals, prisons and jails, and

nursing homes.⁵⁸ Brazil has integrated development of family farming with school meal procurement programs. During President Luiz Inacio Lula da Silva's administration, the government changed procurement policies, favoring the purchase of non-processed, fresh, locally produced foods such as rice, beans, vegetables and fruits for the meals programme of over 45 million children in the public education system. The programme has been successful in improving the nutrition quality of the meals, thus reducing the risk of obesity, while at the same time supporting local family and cooperatives by requiring that at least 30% of all foods supplied to schools come from local producers.^{19,59,60} The strategy has now been extended to Africa.⁶¹

To spur change in the food supply to promote health, many governments have developed initiatives that engage with the food industry, such as the U.S. White House Task Force on Childhood Obesity (created in conjunction with US First Lady Michelle Obama's "Let's Move" initiative).⁶² As part of these efforts, companies have taken specific actions to only permit advertising that meets specified nutritional standards, improve the health of children's menu items and reduce calories and sodium in their menu offerings, lower the costs of fruits, vegetables, and whole grains, and work with manufacturers to eliminate trans fats and reduce sugar and sodium in products sold in their stores. In addition, through the Healthy Weight Commitment Foundation, a group of the largest food manufacturers have pledged to cut 1.5 trillion calories from food supply by 2015. An initial report indicated that the companies succeeded in selling 6.4 trillion fewer calories in 2012 relative to 2007.⁶³

Since launching in 2011, the Responsibility Deal in England has also motivated a series of pledges that have prompted healthy actions by food companies.^{64,65} Over 70 percent of the fast food and takeaway meals sold have calories labelled on menus; 22 companies,

representing two-thirds of pre-packaged food, have pledged to implement the UK Government's 2013 recommended Front of Pack Nutrition Labelling scheme; the top ten major supermarkets and 65% of major high street and contract caterers have committed to removing artificial trans fats; almost half of the food manufacturing and retail industry has committed to reducing saturated fat content across a range of products; 70 percent of the retail market and 65 percent of the major high street and contract caterers committed to salt reduction; and 36 leading food and drink companies have signed up for a calorie reduction pledge. In the final paper in this *Lancet* series, Swinburn and colleagues discuss the ways in which these companies are being held accountable for these changes.¹¹

Behaviour Change Communication Actions

There have also been a number of examples of behavior change communication strategies. China has focused its efforts to date on the development and promulgation of guidelines, including Guidelines for Prevention and Control of Overweight and Obesity of Chinese Adults and Guidelines on Snacks for Chinese Children and Adolescents.⁶⁶ The government has also launched a small number of campaigns, notably the 121 Health Action strategy of 'ten thousand steps a day, the balance of eating and activity and a healthy life' in 2007.⁶⁶ In 23 Latin American countries surveyed by WHO, 70% reported having programs related to food-based dietary guidelines, nutritional counseling in primary care, and public service campaigns.⁶⁷

There have also been numerous examples of public service campaigns launched in the United States, including New York City's 'pouring on the pounds' public education campaign that highlights the risk of over-consuming sugar-sweetened beverages;⁶⁸ this campaign was coupled with a number of policy changes as well. Los Angeles, California launched a 'Sugar

Pack' campaign designed to inform consumers about the number of sugar packs in sugar-sweetened beverages, using transit and billboard ads, and social media messaging.⁶⁹ In West Australia, the public health education campaign LiveLighter has been launched to encourage healthier dietary and physically activity habits.⁷⁰ One component of LiveLighter is a mass media campaign, coupled with other efforts to engage communities through social media, online and print resources, advocacy efforts and engagement with retailers.

Not Enough Progress

Obesity and related non-communicable diseases are being taken more seriously than ever before by many governments. However, although we reviewed a number of promising policy actions from across the globe, there is still a long way to go in terms of the quantity and quality of food policy actions and understanding their effectiveness. Many countries lack policies. According to the WHO, about one quarter of countries did not have a policy on unhealthy eating in 2010, and few countries had developed policy options in all the key areas.¹³ Low-income countries fare worse; over 50% of these said they had no policy on diet compared with 9% of high-income countries. For example, while almost all high-income countries report some kind of initiative to promote fruit and vegetable consumption among school children,^{71,72} a survey by FAO found very few middle-income countries have undertaken such efforts.⁷³

As policy develops from developmental stages through to actual implementation, there is a tendency for the educational programs to make it through but for the regulatory and fiscal measures to become stalled and unimplemented. The actual implementation of strategies to address obesity has largely favoured behaviour change communications over changes in food and physical activity environments.^{74,75} Further, although we described some promising

examples of governments engaging industry to promote healthier diets, some of these efforts have occurred in place of government regulatory intervention, rather than alongside. For example, in the case of food promotion to children, the majority of actions taken around the world have been in the form of “approving” self-regulation.⁷⁶ Internationally, there are now more industry-led “pledges” on food advertising to children than government regulations.⁷⁷ However, a major concern with industry regulation is the failure of these efforts to be sufficiently comprehensive in scope, rigorous in the nutritional criteria, or adequate in their enforcement and sanctions.^{78,79}

The Second Lancet Series on Obesity

In the current *Lancet* Series, each paper tackles a particular set of actions that will be crucial to achieving global and national progress. In doing so, the papers challenge several dichotomies that frame obesity and its solutions in overly simplistic ‘either/or’ terms. Interrogating these dichotomies has generated new perspectives and actions. The papers argue that we need to intervene where the dichotomies overlap; bridging these seemingly competing perspectives is where action is often most needed. Throughout the series, we use examples and case studies to provide policy makers with compelling examples of how to think about and implement the necessary changes.

Barriers to Progress

There are many reasons for the patchy progress on obesity prevention as discussed throughout this Series. These include industry pressures and pushback against food policies designed to improve public health, the limited ability or unwillingness of governments to implement policies, and lack of pressure from civil society for policy action. There are a range of reasons for limited demand for action from civil society, including lack of

organizations and capacity, limited funding, weak coordination, and low priority of these issues.⁸⁰

In the current paper, we examine the framing of obesity, which underpins many of the barriers. By framing, we are referring to divergent beliefs about what drives and sustains obesity. Public health problems often tend to be viewed from one of two competing perspectives: an individualizing frame that places responsibility on the individual or a systemic frame that places responsibility on environmental and social forces. These frames can have a powerful influence on public opinion as well as support for and enactment of competing policies.⁸¹⁻⁸³ Systemic frames tend to encourage government action on behalf of the public's health, while individualizing frames tend to point towards no or limited government action.⁸⁴ However, this dichotomy stagnates progress. In reality, these frames lay out two truths: that people bear some personal responsibility for their health and that environmental factors can readily support or undermine the ability of people to exercise personal responsibility. Further, the individual and environment can interact in reciprocal ways – the environments deliver large amounts of unhealthy foods for individuals, which influences their food preferences and sustains or increases the demand for unhealthy foods. The key insight lies at the interaction of the two truths of personal responsibility and environmental influence.

A series of forces in the environment are currently exploiting biological, psychological, social, and economic vulnerabilities of individuals in ways that undermine people's ability to act in their self-interest. The influence of the current environment on the individual in turn impacts the way individuals shape their environments. This opens up opportunities to break

this vicious cycle through government regulation and efforts from industry and civil society, rather than trying to intervene on individuals or their environments in isolation.

Biological Vulnerabilities

Modern food environments are filled with nutrient-poor, energy-dense foods. These foods are highly palatable and processed in ways that make it difficult for the body to regulate intake and weight. Although the perception that certain foods can be addictive is widespread in popular culture, science is trying to understand whether certain foods act on the brain in ways that mimic addictive substances like drugs.

Incentivized to maximize profits, the food industry manipulates ingredients like sugar, fat, and salt along with flavor enhancers, food additives, and caffeine to increase the reward value of foods.⁸⁵ Many ultra-processed foods are also stripped of fiber and protein, two components that help slow absorption of ingredients like sugar into the bloodstream. Rat research suggests that exposure to ultra-processed foods high in added sugar, fat, and salt leads to behavioral⁸⁶ and neurobiological changes⁸⁶ consistent with an addictive process. Human neuroimaging work has also shown that food intake and drug use trigger similar brain activity.⁸⁷ This biological vulnerability to ultra-processed foods is especially concerning for children as they have even stronger preferences for sweet foods than adults.⁸⁸⁻⁹⁰

Further, childhood is a period when industry works to develop brand loyalty. Marketing and early exposure to ultra-processed foods also shapes children's taste expectations and preferences for unhealthy products starting at a young age.^{17,90} The key question is whether these ultra-processed, palatable foods hijack the brain in ways that create a public health menace. The discovery that nicotine was addictive strengthened support for tobacco control

policies such as taxation and restrictions on advertising to youth.⁹¹ If science finds that some foods may trigger an addictive process, it could shift public opinion about the role of policy in addressing obesity.

There are also significant biological barriers to losing excess weight once its gained. Changes in brain chemistry, metabolism, and hunger and satiety hormones during weight loss attempts make it difficult to shed and keep off weight.⁹² This can prompt a vicious cycle of failed dieting attempts perpetuated by strong biological resistance to rapid weight loss, the re-gaining of weight, and feelings of personal failure at the inability to sustain a weight loss goal. This sense of failure then makes individuals more vulnerable to promises of quick fixes and minimally regulated claims appearing on weight loss products.

Psychological Vulnerabilities

Psychological research has illuminated the many ways in which we are influenced by food choice architecture (the context in which people make dietary decisions),⁹³ including the serving size of containers, the placement of food items in supermarkets, the pricing of products, and the promotional strategies used to market foods.⁹⁴ The food industry is incentivized to design choice environments that promote consumption of foods of poor nutritional quality, which tend to be the highest profit margin products. These environmental forces are varied, subtle, and very influential^{94,95} because they leverage psychological biases in favor of overeating. For example, people have a strong tendency to stick with default options.⁹⁶ This is illustrated by higher organ donation participation in countries that automatically enroll people as donors, with the option of opting out, versus countries where people must opt-in to be a donor.⁹⁷ This psychological bias is exploited by current food defaults such as large portion sizes at restaurants, which promote overeating.^{98,99} Despite

consumers' desire for smaller portions, customers rarely depart from the status quo by asking for less food.¹⁰⁰

Social and Economic Vulnerabilities

Social vulnerabilities are also exploited in many modern environments. Societal shifts in family roles and the entrance of women into the full-time labor force increase the appeal of restaurant and other ready-to-eat foods that are quick and convenient, but less healthy than home-cooked meals.¹⁰¹ In high-income countries, energy-dense, nutrient-poor foods tend to be inexpensive,¹⁰² and low-income neighborhoods are saturated with the availability of unhealthy options.^{103,104} In addition, food and beverage companies engage in targeted marketing of specific groups, including adolescents and children, racial/ethnic minority groups and those in low-income neighborhoods.^{105,106} These socioeconomic issues expose the difficulty of exercising personal responsibility for food choices in certain contexts.

Taken together, it is clear that the existing environment interacts with these vulnerabilities in problematic ways that have promoted overconsumption of ultra-processed foods. Thus, the debate that seeks to place blame on either the environment *or* the individual, is more productively re-framed by acknowledging that environmental influences that exploit individuals' vulnerabilities can make it difficult for people to make decisions that make them healthier.

Papers in the Series

In this first paper, we have proposed that the debate over individual choice versus environmental influence be re-framed as the interaction between the two. We frame obesity

as a problem driven largely by environmental influences that undermine the self-regulatory capacity people have to make responsible decisions about diet and physical activity.

The second paper in this *Lancet* series by Hawkes et al.¹⁷ also challenges the dichotomy between a traditional public health perspective (which identifies food systems, food environments, and the food industry as the leading cause of obesity) and an individual perspective (which argues that consumer preferences drive unhealthy food consumption; the market simply produces what consumers want). The authors discuss the ways in which the food, social and information environment influence the development of preferences *and* the ability of people to express existing preferences, advocating for policies that take both into account.

The paper by Huang and colleagues¹⁰⁷ builds on this broad theme by interrogating the false dichotomy that either top-down (e.g., government) or bottom-up (e.g., grassroots) solutions are needed. Public health experts and policy makers tend to focus on top-down solutions (what policies can we pass now to alter the environment and improve health?), which treats the individuals as passive recipients of information and change. However, the reality is that many policy efforts lack political support, and although the passage of policies is critical, there is also a need to mobilize policy action from the bottom up. Huang and colleagues focus on bottom-up strategies that view individuals as active agents that can change their environments.

Lobstein and colleagues¹⁰⁸ focus their paper on childhood obesity, showing global increases in prevalence, with recent, steep increases in low- to middle-income countries. Their paper, in part, explores the tension between prioritizing under- vs. over- nutrition in policymaking.

Many countries, communities, and even households struggle with the co-existence of individuals who are starving and those who have excess weight. Yet those who focus on addressing under-nutrition and those who focus on obesity think about the problems in different ways and advocate for different policy approaches, despite very similar goals. This suggests a need for solutions that target both issues simultaneously.

In the fifth paper, Dietz and colleagues¹⁰⁹ focus on treatment approaches for weight loss and maintenance. They also note the tension between investing in obesity prevention (with its low costs but long term benefits) *or* obesity treatments (with its shorter term gains but higher costs). They argue that reducing global obesity will require a combination of effective, compassionate healthcare coupled with policy and environmental changes to both support those who have lost weight and prevent population weight gain. They also note the power of doctors and health professionals as advocates for prevention and societal approaches.

The final paper in the Series by Swinburn et al., focuses on accountability systems for ensuring action on obesity and healthy food environments.¹¹ Classically this has been framed as being the responsibility of government (to enact food policies), the food industry (to produce healthier foods) or consumers (to demand healthier foods). The authors shift the debate from responsibility (a one party declaration of obligation) to an accountability framework where the obligations are between two or more parties. In the authors' analysis, there are many opportunities for parties to hold each other to account within the spectrum from government regulation (the highest accountability but strongly contested) to voluntary industry codes (which have very little evidence of impact). In particular, quasi-regulatory approaches hold some promise for progressing the impasse over the regulation versus non-regulation dichotomy.

Conclusion

The modest, but impressively challenging goal ahead is to prevent an increase in obesity prevalence. There is no question that obesity is a complex problem and meeting this goal will require substantial and urgent actions not only from governments, but from a range of actors. Through the Global Action Plan on Non-communicable Diseases, there are clear agreements on *what* strategies should be implemented and tested to address obesity, the challenge is *how* to implement the specific actions which make up those strategies. In this paper we have highlighted positive examples of multi-sectoral efforts to tackle obesity, but the progress is patchy and clearly not nearly enough. In this *Lancet* series, a number of priority action areas are described across many different systems. In addition, the papers examine some of the competing narratives where arguments and actions have become stuck and propose new ways of facing the problems and solutions. Major potential areas for progress have emerged from this examination and the multiple actors who can contribute to the solutions are urged to increase current efforts and take new steps so that the current patchy progress can turn into serious strides towards halting the obesity epidemic.

References

1. Finucane MM, Stevens GA, Cowan MJ, Danaei G, Lin JK, Paciorek CJ, et al. National, regional, and global trends in body-mass index since 1980: Systematic analysis of health examination surveys and epidemiological studies with 960 country-years and 9.1 million participants. *Lancet* 2011; **377**:557–67.
2. World Health Organization. Global status report on non-communicable diseases 2010. *World Health Organization* 2011. [cited April 30, 2014] Available at: http://whqlibdoc.who.int/publications/2011/9789240686458_eng.pdf?ua=1
3. Swinburn BA, Sacks G, Hall KD, McPherson K, Moodie ML, Gortmaker SL. Shaped by global drivers and local environments. *Lancet* 2011; **378**: 804–814.
4. Wang CY, McPherson K, Marsh T, Gortmaker SL, Brown M. Health and economic burden of the projected obesity trends in the USA and the UK. *Lancet* 2011; **378**: 815–825.
5. Gortmaker SL, Swinburn BA, Levy D, Carter R, Mabry PL, Finegood DT, Huang T, Marsh T, Moodie ML. Changing the future of obesity: Science, policy, and action. *Lancet* 2011; **378**: 838-847.
6. World Health Organization. Global action plan for the prevention and control of noncommunicable diseases 2013-2020. *World Health Organization* 2013; [cited April 30, 2014] Available at: http://www.who.int/nmh/events/2013/revised_draft_ncd_action_plan.pdf
7. World Health Organization. Noncommunicable disease global monitoring framework. [cited April 30, 2014] Available at: http://www.who.int/nmh/global_monitoring_framework/en/
8. World Health Organization. Comprehensive implementation plan on maternal, infant and young child nutrition. *World Health Assembly* 2012. [cited April 30, 2014] Available at: http://www.who.int/nutrition/topics/WHA65.6_annex2_en.pdf
9. Franco M, Bilal U, Ordunez P, Benet M, Morejon A, Caballero B, Kennelly JF, Cooper RS. Population-wide weight loss and regain in relation to diabetes burden and cardiovascular mortality in Cuba 1980-2010: repeated cross sectional surveys and ecological comparison of secular trends. *BMJ* 2013; **346**: 1–9
10. Olds T, Maher C, Zumin S, Peneau S, Lioret S, Castetbon K, Bellisle, de Wilde J, Hohepa M, Maddison R, Lissner L, Sjoberg A, Zimmermann M, Aeberli I, Ogden C, Flegal K, Summerbell C. Evidence that the prevalence of childhood overweight is plateauing: Data from nine countries. *Int J Pediatr Obes* 2011; **6**: 342–60.
11. Swinburn B, Kraak V, Rutter H, Vandevijvere S, Lobstein T, Sacks G, Gomes F, Marsh T, Magnusson R. Strengthening accountability systems to create healthy food environments and reduce global obesity. *Lancet*.

12. Lee IM, Shiroma EJ, Lobelo F, Puska P, Blair SN, Katzmarzyk PT, Lancet Physical Activity Series Working Group. Effect of physical inactivity on major non-communicable diseases worldwide: An analysis of burden of disease and life expectancy. *Lancet* 2012; **380**:219–29.
13. World Health Organization. Assessing national capacity for the prevention and control of noncommunicable diseases. Report of the 2010 global survey. *World Health Organization* 2012. [cited April 30, 2014] Available at: http://www.who.int/cancer/publications/national_capacity_prevention_ncds.pdf
14. Cecchini M, Sassi F, Lauer JA, Lee YY, Guajardo-Barron V, Chisholm D. Tackling of unhealthy diets, physical inactivity, and obesity: health effects and cost-effectiveness. *Lancet* 2010; **376**: 1775–84.
15. Mozaffarian D, Afshin A, Benowitz NL, Bittner V, Daniels SR, Franch HA, Jacobs DR Jr, Kraus WE, Kris-Etherton PM, Krummel DA, Popkin BM, Whitsel LP, Zakai NA; American Heart Association Council on Epidemiology and Prevention, Council on Nutrition, Physical Activity and Metabolism, Council on Clinical Cardiology, Council on Cardiovascular Disease in the Young, Council on the Kidney in Cardiovasc. Population approaches to improve diet, physical activity, and smoking habits: a scientific statement from the American Heart Association. *Circulation* 2012; **126**:1514–63.
16. Kumanyika SK, Obarzanek E, Stettler N, Bell R, Field AE, Fortmann SP, Franklin BA, Gillman MW, Lewis CE, Poston WC 2nd, Stevens J, Hong Y; American Heart Association Council on Epidemiology and Prevention, Interdisciplinary Committee for Prevention. Population-based prevention of **obesity**: the need for comprehensive promotion of healthful eating, physical activity, and energy balance: a scientific statement from American Heart Association Council on Epidemiology and Prevention, Interdisciplinary Committee for Prevention (formerly the expert panel on population and prevention science). *Circulation*. 2008; **118**:428–64.
17. Hawkes C, Jewell J, Allen K. A food policy package for healthy diets and the prevention of obesity and diet-related non-communicable diseases: the NOURISHING framework. *Obes Rev* 2013; **14** Suppl 2:159–68.
18. World Cancer Research Fund International. WCRF International food policy framework for healthy diets: NOURISHING. [cited April 30, 2014] Available at: http://www.wcrf.org/policy_public_affairs/nourishing_framework/
19. Jacoby E, Rivera J, Cordera S, Gomes F, Garnier L, Castillo C, et al. Legislation, children, obesity. Standing up for children's right in Latin America. [Commentaries]. *World Nutrition* 2012; **3**: 483–516.
20. Declaration of Port-of-Spain. Uniting to stop the epidemic of chronic noncommunicable diseases. *Caribbean Community Secretariat* 2011. [cited April 25, 2014] Available at: http://www.caricom.org/jsp/communications/meetings_statements/declaration_port_of_spain_chronic_ncds.jsp

21. Visser R, Atkinson RL. Proceedings of the Second Pan American Conference on Obesity with special attention to childhood obesity and a workshop, 'Education for childhood obesity prevention: A life-course approach'. *Int J Obes Supplements* 2013; **3**, S1–S2.
22. World Health Organization. WHO European ministerial conference on counteracting obesity. 2007. [cited April 30, 2014] Available at: http://www.euro.who.int/_data/assets/pdf_file/0006/96459/E90143.pdf
23. World Health Organization. Apia communique on healthy islands, NCDs, and the post-2015 development agenda. Tenth Pacific Health Ministers Meeting, 4, July 2013. [cited May 1, 2014] Available at: http://www.wpro.who.int/southpacific/pic_meeting/2013/meeting_outcomes/10th_PHM_M_Apia_Communique.pdf?ua=1
24. World Cancer Research Fund International. Nutrition label standards and regulations on the use of claims and implied claims on foods. [cited April 25, 2014] Available at: http://www.wcrf.org/policy_public_affairs/nourishing_framework/nutrition_labelling_claims.php
25. World Cancer Research Fund International NOURISHING framework. Use economic tools to address food affordability and purchase incentives. [cited April 25, 2014] Available at: <http://www.wcrf.org/PDFs/NOURISHING/Use-Economic-Tools.pdf>
26. Brownell KD, Farley T, Willett WC, Popkin BM, Chaloupka FJ, Thompson JW, et al. The public health and economic benefits of taxing sugar-sweetened beverages. *The NEJM* 2009; **361**: 1599–605.
27. Kim S, Lee Y, Yoon J, Chung S-J, Lee S-K, Kim H. Restriction of television food advertising in South Korea: impact on advertising of food companies. *Health Promot Int* 2013; **28**: 17–25.
28. Adams J, Tyrrell R, Adamson AJ, White M. Effect of restrictions on television food advertising to children on exposure to advertisements for 'less healthy' foods: repeat cross-sectional study. *PloS One* 2012; **7**: e31578.
29. Dowell D, Farley TA. Prevention of non-communicable diseases in New York City. *Lancet* 2012; **380**: 1787–1789.
30. Ahmed A. Junk food banned from every Dubai school canteen. May 18, 2011 [cited October 29, 2013]; Available from: <http://www.thenational.ae/news/uae-news/junk-food-banned-from-every-dubai-school-canteen>
31. United States Department of Agriculture Foreign Agricultural Service. Global Agricultural Information Network. GAIN report: Mexico. 2014. [cited April 30, 2014] Available at: http://gain.fas.usda.gov/Recent%20GAIN%20Publications/Food%20and%20Agricultural%20Import%20Regulations%20and%20Standards%20Mexico%202013_Mexico%20AT_O_Mexico_1-23-2014.pdf

32. Hawkes C, Smith T, Jewell J, Wardle J, Hammond R, Friel S. How can food policy actions become a more effective way of addressing obesity? *Lancet*.
33. Fry C. Putting Business to Work for Health: Incentive Policies for the Private Sector. [Report] [cited February 28, 2013]; Available from: http://changelabsolutions.org/sites/default/files/documents/Incentives_FINAL_20120514.pdf
34. Karpyn A, Young C, Weiss S. Reestablishing Healthy Food Retail: Changing the Landscape of Food Deserts. *Child Obes* 2012; **8**: 28–30.
35. US Department of Health and Human Services. Healthy food financing initiative. January 18, 2011 [cited May 8, 2013]; Available from: <http://www.acf.hhs.gov/programs/ocs/resource/healthy-food-financing-initiative-0>
36. ChangeLab Solutions. Healthy Corner Stores: The State of the Movement. [Report] 2009 [cited February 28, 2013]; Available from: <http://changelabsolutions.org/sites/default/files/documents/HCSReport.pdf>
37. Krech R, Buckett K. The Adelaide Statement on Health in All Policies: moving towards a shared governance for health and well-being. *Health Promot Int* 2010; **25**: 258–60.
38. Australian Government Department of Health. National partnership agreement on preventive health. [cited April 30, 2014] Available at: <http://www.health.gov.au/internet/main/publishing.nsf/Content/phd-prevention-np>
39. Department of Health, Victoria Australia. Prevention and population health. Healthy Together Victoria 2014. [cited April 30, 2014] Available at: <http://www.health.vic.gov.au/prevention/healthytogether.htm>
40. Frank LD, Schmid TL, Sallis JF, Chapman J, Saelens BE. Linking objectively measured physical activity with objectively measured urban form: findings from SMARTRAQ. *Am J Prev Med* 2005; **28**: 117–25.
41. Ewing R, Frank L, Kreutzer, R. Understanding the relationship between public health and the built environment: A report prepared for the LEED-ND Committee. [Report] 2009 US Green Building Council. [cited October 29, 2013] Available from: <http://www.usgbc.org/Docs/Archive/General/Docs3901.pdf>.
42. Stair P, Wooten H, Raimi M. How to Create and Implement Healthy General Plans: a Toolkit for Building Healthy, Vibrant Communities through Land Use Policy Change. Oakland, CA: ChangeLab Solutions (formerly Public Health Law & Policy) and Raimi + Associates; 2008.
43. Philadelphia Department of Public Health. Philadelphia 2035: Planning and Zoning for a Healthier City: The City's new Comprehensive Plan and its Role in Improving Public Health. . [Report] December 2010 [cited October 29, 2013]; Available from: http://phila2035.org/wp-content/uploads/2011/02/Phila2035_Healthier_City_Report.pdf.

44. ChangeLab Solutions. Pedestrian Friendly Code Directory: Public Art. [cited February 28, 2013]; Available from: <http://changelabsolutions.org/childhood-obesity/public-art>.
45. ChangeLab Solutions. Pedestrian Friendly Code Directory: Medium to High Densities [cited February 28, 2013]; Available from: <http://changelabsolutions.org/childhood-obesity/medium-high-densities>
46. ChangeLab Solutions. Pedestrian Friendly Code Directory: Landmarks. [cited February 28, 2013]; Available from: <http://changelabsolutions.org/childhood-obesity/landmarks>
47. ChangeLab Solutions. Abundant Seating Pedestrian Friendly Code Directory: Abundant Seating. [cited February 28, 2013]; Available from: <http://changelabsolutions.org/childhood-obesity/abundant-seating>
48. ChangeLab Solutions. Pedestrian Friendly Code Directory: Adequate Access to Transit. [cited; Available from: <http://changelabsolutions.org/childhood-obesity/adequate-access-transit>;
49. National Policy and Legal Analysis Network. Establishing Land use Protections for Farmers' Markets. Oakland, CA: ChangeLab Solutions (formerly Public Health Law & Policy) December, 2009.
50. ChangeLab Solutions (formerly Public Health Law & Policy). Healthy Mobile Vending Policies. October 2009 [cited October 29, 2013]; Available from: http://changelabsolutions.org/sites/default/files/MobileVending_FactSht_FINAL_091008.pdf.
51. ChangeLab Solutions. Mobile Vending Laws in the 10 Most Populous U.S. Cities. [cited February 28, 2013]; Available from: http://changelabsolutions.org/sites/default/files/MobileVending_chart_FINAL_2010.02.17.pdf.
52. Smart Growth America and National Complete Streets Coalition. Complete Streets Local Policy Workbook. August 2012 [cited October 29, 2013]; Available from: <http://www.smartgrowthamerica.org/documents/cs/resources/cs-policyworkbook.pdf>
53. Smart Growth America. Complete Streets Policy Analysis 2011. Washington, DC; August 2012.
54. Safe Routes to School National Partnership. Safe Routes to School: Helping Communities Save Lives and Dollars: 2011 Policy Report; September 2011.
55. Government of South Africa. Strategic Plan for the Prevention and Control of Non-Communicable Diseases 2013-17. [Report] 2013 [cited October 29, 2013]; Available from: <http://www.health-e.org.za/wp-content/uploads/2013/09/NCDs-STRAT-PLAN-CONTENT-8-april-proof.pdf>
56. World Health Organization. Non-communicable diseases country profiles. 2011. [cited April 30, 2014] Available at: http://whqlibdoc.who.int/publications/2011/9789241502283_eng.pdf

57. Australia Network News. (2013 May 20) Samoa lifts ban on high fat turkey tails. [cited April 30, 2014] Available at: <http://www.abc.net.au/news/2013-05-20/an-samoa-lifts-ban-on-high-fat-turkey-tails/4699506>
58. ChangeLab Solutions. Model Healthy Beverage Vending Agreement. [cited February 28, 2013]; Available from: <http://changelabsolutions.org/publications/healthy-bev-vending-agreement>.
59. Fundo Nacional de Desenvolvimento da Educação. [cited 2013 October 1]; Available from: <http://www.fnde.gov.br/programas/alimentacao-escolar/alimentacao-escolar-apresentacao>
60. Otsuki K. The local food revolution in Brazil's schools. March 1, 2013 [cited October 29, 2013]; Available from: <http://www.aljazeera.com/indepth/opinion/2013/02/201322853527633979.html>
61. Food and Agriculture Organization. Africa to benefit from Brazil- FAO school meals experience. 2013 [cited October 1, 2013]; Available from: <http://reliefweb.int/report/world/africa-benefit-brazil-fao-school-meals-experience>
62. Let's Move. [cited April 25, 2014] Available at: <http://www.letsmove.gov/accomplishments>
63. Healthy Weight Commitment foundation. Fighting obesity by balancing calories in with calories out. [cited April 25, 2014] Available at: http://www.healthyweightcommit.org/news/major_food_beverage_companies_remove_6.4_trillion_calories_from_u.s._market/.
64. Department of Health, England. Public health responsibility deal. 2012. [cited April 30, 2014] Available at: <https://responsibilitydeal.dh.gov.uk/about/>
65. Jebb SA. The Public Health Responsibility Deal Food Network. *Nutr Bull* 2012; **37**:355–8.
66. Wang H, Zhai F. Programme and policy options for preventing obesity in China. *Obes Rev* 2013; **14** Suppl 2:134–40.
67. World Health Organization. What does it take to scale up nutrition action? 2013. [cited April 30, 2014] Available at: http://apps.who.int/iris/bitstream/10665/84408/1/9789241505529_eng.pdf?ua=1
68. New York City Department of Health and Mental Hygiene. Pouring on the pounds campaign. [cited April 25, 2014] Available at: <http://www.nyc.gov/html/doh/html/living/sugarydrink-media.shtml>
69. Barragan NC, Noller AJ, Robles B, Gase LN, Leighs MS, Bogert S, Simon PA, Kuo T. The "sugar pack" health marketing campaign in Los Angeles County, 2011-2012. *Health Promot Pract*. 2014; **15**:208–16.

70. LiveLighter. [cited April 30, 2014] Available at: <http://livelighter.com.au/about.aspx>
71. Capacci S, Mazzocchi M, Shankar B, Macias JB, Verbeke W, Pérez-Cueto FJ, Koziol-Kozakowska A, Piórecka B, Niedzwiedzka B, D'Addesa D, Saba A, Turrini A, Aschemann-Witzel J, Bech-Larsen T, Strand M, Smillie L, Wills J, Traill WB. Policies to promote healthy eating in Europe: a structured review of policies and their effectiveness. *Nutr Rev* 2012; **70**:188–200.
72. European Commission. Agriculture and Rural Development. School Fruit Scheme. [cited April 30, 2014] Available at: http://ec.europa.eu/agriculture/sfs/eu-countries/index_en.htm
73. Wijesinha-Bettoni R, Orito A, Löwik M, Mclean C, Muehlhoff E. Increasing fruit and vegetable consumption among schoolchildren: Efforts in middle-income countries. *Food Nutr Bull* 2013; **34**:75–94.
74. Hawkes C. Promoting healthy diets through nutrition education and change in the food environment: an international review of actions and their effectiveness. Rome: *Food and Agriculture Organization of the United Nations* 2013.
75. Lachat C, Otchere S, Roberfroid D, Abdulai A, Seret FM, Milesevic J, Xuereb G, Candeias V, Kolsteren P. Diet and physical activity for the prevention of noncommunicable diseases in low- and middle-income countries: A systematic policy review. *PLoS Med* 2013; **10**:e1001465
76. Hawkes C, Lobstein T. Regulating the commercial promotion of food to children: a survey of actions worldwide. *Int J Pediatr Obes* 2011; **6**:83-94.
77. Yale Rudd Center for Food Policy and Obesity. Pledges on food marketing to children worldwide. [cited April 30, 2014] Available at: <http://www.yaleruddcenter.org/marketingpledges/>
78. Hawkes C, Harris JL. An analysis of the content of food industry pledges on marketing to children. *Pub Health Nutr* 2011; **14**:1403–1414.
79. Galbraith-Emami S1, Lobstein T. The impact of initiatives to limit the advertising of food and beverage products to children: a systematic review. *Obes Rev* 2013; **14**:960–974.
80. Popkin B, Monteiro C, Swinburn B. Overview: Bellagio Conference on Program and Policy Options for Preventing Obesity in the Low- and Middle-Income Countries. *Obes Rev* 2013; **14** Suppl 2:1–8.
81. Nelson, Thomas, Oxley, Zoe, Clawson, Rosalee. Toward a psychology of framing effects. *Political Behavior* 1997; **19**:221–46.
82. Jacobs, L, Shapiro, R. Politicians don't pander: Political manipulation and the loss of democratic responsiveness. Chicago: University of Chicago Press; 2000.
83. Stimson, JA. Tides of consent: How public opinion shapes american politics. New York: Cambridge University Press; 2004.

84. Lawrence, Regina G. Framing obesity: The evolution of news discourse on a public health issue. *The International Journal of Press/Politics* 2004; **9**:56–75.
85. Gearhardt AN, Bragg MA, Pearl RL, Schvey NA, Roberto CA, Brownell KD. Obesity and public policy. *Annu Rev Clin Psychol* 2012; **8**:405–30.
86. Johnson PM, Kenny PJ. Dopamine D2 receptors in addiction-like reward dysfunction and compulsive eating in obese rats. *Nat Neurosci* 2010; **13**:635–41.
87. Volkow ND, Wang G-J, Tomasi D, Baler RD. Obesity and addiction: Neurobiological overlaps. *Obes Rev* 2013; **14**:2–18.
88. Desor JA, Beauchamp GK. Longitudinal changes in sweet preferences in humans. *Physiol Behav* 1987; **39**:639–41.
89. Schwartz C, Issanchou S, Nicklaus S. Developmental changes in the acceptance of the five basic tastes in the first year of life. *Br J Nutr* 2009; **102**:1375–85.
90. Beauchamp GK, MM. Dietary experience and sweet taste preference in human infants. *Appetite* 1982; **3**:139–52.
91. Nathanson CA. Social movements as catalysts for policy change: The case of smoking and guns. *Journal of Health Politics and Law* 1999; **24**:421–88.
92. Rosenbaum M, Leibel RL. Adaptive thermogenesis in humans. *Int J Obes (Lond)* 2010; **34 Suppl 1**:S47–55.
93. Thaler RH, SCR. *Nudge improving decisions about health, wealth, and happiness*. New York, New York: Penguin Group; 2009.
94. Chandon P, Wansink B. Does food marketing need to make us fat? A review and solutions. *Nutr Rev* 2012; **70**:571–93.
95. Harris JL, Pomeranz JL, Lobstein T, Brownell KD. A crisis in the marketplace: How food marketing contributes to childhood obesity and what can be done. *Annu Rev Public Health* 2009; **30**:211–25.
96. Samuelson W, Zeckhauser, R. Status quo bias in decision making. *Journal of Risk and Uncertainty* 1988; **1**:7–59.
97. Johnson EJ, Goldstein D. Medicine. Do defaults save lives? *Science* 2003; **302**:1338–39.
98. Ledikwe JH, Ello-Martin JA, Rolls BJ. Portion sizes and the obesity epidemic. *J Nutr.* 2005; **135**:905–9.
99. Ello-Martin JA, Ledikwe JH, Rolls BJ. The influence of food portion size and energy density on energy intake: Implications for weight management. *Am J Clin Nutr.* 2005; **82**(1 Suppl):236S–41S.

100. Schwartz J, Riis J, Elbel B, Ariely D. Inviting consumers to downsize fast-food portions significantly reduces calorie consumption. *Health Aff (Millwood)* 2012; **31**:399–407.
101. Guthrie JF, Lin B-H, Frazao E. Role of food prepared away from home in the american diet, 1977-78 versus 1994-96: Changes and consequences. *J Nutr Educ Behav* 2002; **34**:140–50.
102. Burns CSGRMBGSB. Correctly calculating the cost of food. *Nutr Rev* 2010; **68**:182–3.
103. Andreyeva T, Blumenthal DM, Schwartz MB, Long MW, Brownell KD. Availability and prices of foods across stores and neighborhoods: The case of New Haven, Connecticut. *Health Aff (Millwood)* 2008; **27**:1381–8.
104. Moore LV, Diez Roux AV. Associations of neighborhood characteristics with the location and type of food stores. *Am J Public Health* 2006; **96**:325–31.
105. Montgomery KC, Chester J. Interactive food and beverage marketing: Targeting adolescents in the digital age. *J Adolesc Health* 2009; **45** (3 Suppl):S18–29.
106. Yancey AK, Cole BL, Brown R, Williams JD, Hillier A, Kline RS, et al. A cross-sectional prevalence study of ethnically targeted and general audience outdoor obesity-related advertising. *Milbank Q* 2009; **87**:155–84.
107. Huang T TK, Cawley JH, Ashe M, Costa SA, Frerichs LM, Zwicker L, Rivera JA, Levy D, Hammond RA, Lambert EV, Kumanyika SK. Mobilising policy action for obesity prevention. *Lancet*.
108. Lobstein T, Abdelaziz FB, Jackson-Leach R, Moodie ML, Hall KD, Gortmaker SL, Swinburn BA, James P, Wang Y, McPherson K. Child and adolescent obesity: time to tackle food environments. *Lancet*.
109. Dietz WH, Baur LA, Hall K, Puhl R, Taveras EM, Uauy R, Kopelman P. New directions for health professionals in the management of obesity. *Lancet*.

Figure 1. WCRF INTERNATIONAL NOURISHING FRAMEWORK:

Food policy package for healthy diets and the prevention of obesity and diet-related Noncommunicable diseases^{17,18}

DOMAIN		POLICY AREA	EXAMPLES OF POTENTIAL POLICY ACTIONS
FOOD ENVIRONMENT	N	Nutrition label standards and regulations on the use of claims and implied claims on foods	e.g. Nutrient lists on food packages; clearly visible 'interpretive' and calorie labels; menu, shelf labels; rules on nutrient and health claims
	O	Offer healthy foods and set standards in public institutions and other specific settings	e.g. Fruit and vegetable programmes; standards in education, work, health facilities; award schemes; choice architecture
	U	Use economic tools to address food affordability and purchase incentives	e.g. Targeted subsidies; price promotions at point of sale; unit pricing; health-related food taxes
	R	Restrict food advertising and other forms of commercial promotion	e.g. Restrict advertising to children that promotes unhealthy diets in all forms of media; sales promotions; packaging; sponsorship
	I	Improve the quality of the food supply	e.g. Reformulation; elimination of trans fats; reduce energy density of processed foods; portion size limits
	S	Set incentives and rules to create a healthy retail environment	e.g. Incentives for shops to locate in underserved areas; planning restrictions on food outlets; in-store promotions
FOOD SYSTEM	H	Harness supply chain and actions across sectors to ensure coherence with health	e.g. Supply-chain incentives for production; public procurement through 'short' chains; health-in-all policies; governance structures for multi-sectoral engagement
BEHAVIOUR CHANGE COMMUNICATION	I	Inform people about food and nutrition through public awareness	e.g. Education about food-based dietary guidelines, mass media, social marketing; community and public information campaigns
	N	Nutrition advice and counseling in health care settings	e.g. Nutrition advice for at-risk individuals; telephone advice and support; clinical guidelines for health professionals on effective interventions for nutrition
	G	Give nutrition education and skills	e.g. Nutrition, cooking/food production skills on education curricula; workplace health schemes; health literacy programmes